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TRANSMITTAL FORM

(To be used for all correspondence after initial filing)

Application No.	10/544,898
Filing Date	09/12/2005
First Named Inventor	Matti Hietaniemi
Group Art Unit	1731
Examiner Name	E. Hug
Attorney Docket Number	METSO-45

Total Number of Pages in This Submission		
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	David R.J. Stiennon, Reg. No. 33212
Signature	<i>David R.J. Stiennon</i>
Date	August 14, 2008

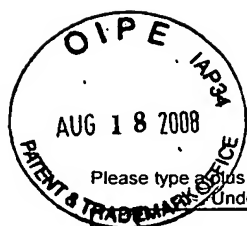
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Total Number of Pages in This Submission

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☐ Amendment / Response
- ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
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- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/
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Under 37 CFR 1.52 or 1.53

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- ☐ Proprietary Information
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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO : 7,407,563
DATED : August 5, 2008
INVENTOR(S): Matti Hietaniemi

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 4, line 15 of the issued patent, "110a₂" should be --10a₂--

In column 4, line 56 of the issued patent, "b," should be --b₁--

In column 5, line 22 of the issued patent, "b," should be --b₁--

In column 5, line 28 of the issued patent, "J₁" should be --J₁--

In column 5, line 51 of the issued patent, "M," should be --M₁--

MAILING ADDRESS OF SENDER:

PATENT NO. 7,407,563

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In The United States Patent And Trademark Office

Applicant: Matti Hietaniemi Date: August 14, 2008
Date Filed: 09/12/2005 Docket No.: METSO-45
App. No.: 10/544,898 Art Unit: 1731
Patent No.: 7,407,563 Issue Date: August 5, 2008
For: Apparatus and Method in the Examiner: E. Hug
Treatment of the Stock Passed to a
Headbox of a Paper Machine or
Equivalent

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David R.J. Stienon, Reg. No. 33212
Name of applicant, assignee or Registered Representative

**Request for Certificate of Correction
With Expedited Processing**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant requests that a Certificate of Correction be issued as shown on the
PTO/SB/44 enclosed herewith.

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Applicant: Matti Hietaniemi
Application No.: 10/544,898
Art Unit: 1731

This request for correction is incurred solely through the fault of the United States Patent and Trademark Office, as is clearly disclosed in the records of the Office. The accompanying documentation unequivocally supports this assertion of USPTO error, and includes copies of the relevant pages of the record, so that this request may be processed without the file. The relevant sections of the record have been highlighted in yellow.

Expedited processing is requested under the provisions of the August 21, 2002, Official Notice in 1262 TMOG 96.

Applicant respectfully requests that the typographical errors in the text of the published patent that were not in the original application be corrected by a Certificate of Correction under 37 CFR 1.322.

In column 4, line 15 of the issued patent, "110a₂" should be --10a₂-- as written in the Substitute Specification dated August 8, 2005 on page 10, line 28.

In column 4, line 56 of the issued patent, "b," should be --b₁-- as written in the Substitute Specification dated August 8, 2005 on page 12, line 6.

In column 5, line 22 of the issued patent, "b," should be --b₁-- as written in the Substitute Specification dated August 8, 2005 on page 13, line 1.

In column 5, line 28 of the issued patent, "J₁" should be --J₁-- as written in the Substitute Specification dated August 8, 2005 on page 13, line 7.

In column 5, line 51 of the issued patent, "M," should be --M₁-- as written in the Substitute Specification dated August 8, 2005 on page 13, line 24.

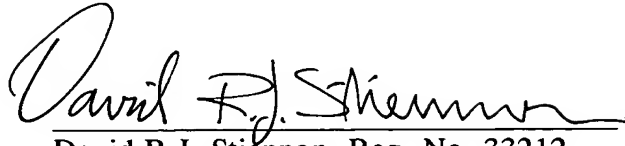
Applicant believes that these Office mistakes include at least one error of consequence that merits the issuance of a Certificate of Correction as it is of such a nature that the intended meaning may not be obvious from the context.

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Applicant: Matti Hietaniemi
Application No.: 10/544,898
Art Unit: 1731

Respectfully submitted,

A handwritten signature in black ink, reading "David R.J. Stiennon". The signature is fluid and cursive, with a long horizontal stroke at the end.

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Relevant pages from printed U.S. Patent No. 7,407,563

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FIG. 2A shows a first embodiment of the invention in which broke-containing stock is passed from a first stock chest to a hydrocyclone plant, and in which embodiment the stock is passed through a wire pit.

FIG. 2B shows a second embodiment of the invention.

FIG. 3 is an illustration of principle of the operation of a hydrocyclone plant.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1A shows a prior art stock system in which all stock $M_1+M_2+M_3$ is passed to a hydrocyclone plant 20, which means that a high capacity is required from the hydrocyclone plant.

FIG. 1B shows an arrangement in accordance with the invention. A stock chest $10a_1$ contains stock, i.e. a pulp fraction M_1 , which contains broke passed from a paper machine and said pulp fraction M_1 is treated in a hydrocyclone plant 20. The cleaned stock, its accepts are passed further into connection with stocks M_2 and M_3 that do not contain broke and further to a headbox 100. The pulp fractions M_2 and M_3 that do not contain broke in stock chests $10a_2$ and $10a_3$ thus bypass the centrifugal cleaning 20, and the accept of the stock M_1 from the hydrocyclone plant 20 is passed into connection with said stocks M_2 and M_3 . The hydrocyclone plant 20 is not required to have as high a capacity as that of the embodiment of FIG. 1A.

In the embodiment of FIG. 2A, stock M_1 , or a pulp fraction, of a first stock chest $10a_1$ also comprises a stock composition that requires centrifugal cleaning before it is passed to a headbox of a paper machine. The stock M_1 contains broke coming from the paper machine and, in addition, it may contain pulp coming from fiber recovery, and further mechanical pulp.

Stock M_2 of a second stock chest $10a_2$ comprises a stock composition that has already undergone centrifugal cleaning, such as recycled fiber and/or chemical pulp and/or TMP.

In the embodiment of FIG. 2A, the stock M_1 is passed from the stock chest $10a_1$ through a stock line a_1 to a lower part of a wire pit 11. The line a_1 includes a pump P_1 . In the lower part of the wire pit, the stock M_1 is diluted with wire water obtained from a wire section of a paper machine (not shown) along a line d_1 to a consistency required by a hydrocyclone plant 20. A line a_2 leads from the lower part of the wire pit 11 to the suction side of a pump P_2 and a line a_2 leads from the pressure side of the pump P_2 to a first centrifugal cleaning step $20a_1$ of the hydrocyclone plant 20 situated in the short circulation of the paper machine. In the figure, the centrifugal cleaning steps are designated with $20a_1, 20a_2, 20a_3 \dots$. An accept line from the centrifugal cleaning step $20a_1$ of the hydrocyclone plant 20; a line a_3 is passed further to join a line b_1 of the stock M_2 of the second stock chest $10a_2$ via a mixing device 12. The mixing device 12 is also supplied with wire water from the wire pit 11 along a line e_1 for diluting the stock M_2 to be fed to the headbox 100 to a suitable consistency.

From the upper part of the wire pit 11 there is further a line c_1 for dilution water, said line c_1 including a pump P_3 . The line c_1 leads further from the discharge side of the pump P_3 to a deaeration tank $13a_1$. The dilution water passed through the deaeration tank $13a_1$ is conducted further after the deaeration treatment to a discharge line f_1 and further while pumped by a pump P_4 to a machine screen $14a_1$, whose accepted fraction, i.e. accept, is passed to a dilution inlet header J_2 in the headbox 100.

The stock chest $10a_2$ is provided with the line b_1 for the stock and further to the suction side of a pump P_5 . On the

discharge side of the pump P_5 , the line b_1 is connected to the mixing device 12, after which there is a pump P_6 in a line b_2 for pumping the combined stock further along the line b_2 to a deaeration tank $13a_2$, from which a discharge line f_2 leads further to the suction side of a pump P_7 . On the discharge side of the pump P_7 , in the line f_2 there is a machine screen $14a_2$, from which an accepted fraction, i.e. accept, is passed to a stock inlet header J_1 of the headbox 100.

In the device arrangement in accordance with the invention, only the broke-containing stock M_1 passed from the stock chest $10a_1$ is treated in the hydrocyclone plant 20. An accept line a_3 leads from said hydrocyclone plant further into connection with the stock line b_1 of the stock M_2 of the second stock chest $10a_2$. Since the stock M_2 of the second stock chest $110a_2$ comprises stock that has already previously undergone centrifugal cleaning, said line can be connected directly to the headbox 100 of the paper machine, via its deaeration tank $13a_2$ and machine screen $14a_2$.

In the embodiment of FIG. 2B, stock M_1 , i.e. a pulp fraction, of a first stock chest $10a_1$ also comprises a stock composition that requires centrifugal cleaning before it is passed to a headbox of a paper machine. The stock M_1 contains broke coming from the paper machine and it can additionally contain pulp coming from fiber recovery and further mechanical pulp.

Stock M_2 of a second stock chest $10a_2$ comprises pulp that has already undergone centrifugal cleaning, such as recycled fiber and/or chemical pulp and/or TMP.

Also in this embodiment of the invention, only the stock M_1 passed from the stock chest $10a_1$ is treated in a hydrocyclone plant 20. In the embodiment of the figure, the stock is passed from the stock chest $10a_1$ through a line a_1 while pumped by a pump P_{10} to a mixing device 120, in which the stock is diluted to a centrifugal cleaning consistency with wire water obtained from a line f_4 , and the stock M_1 is passed further through a line a_2 to the suction side of a pump P_{20} . The line a_2 on the pressure side of the pump P_{20} is connected to the hydrocyclone plant 20 to form the feed of its first centrifugal cleaning step $20a_1$.

In the embodiment of FIG. 2B, the hydrocyclone plant 20 situated in the short circulation of the paper machine includes centrifugal cleaning steps $20a_1, 20a_2$ and $20a_3$. An accept line a_3 leads further from the first hydrocyclone, i.e. the centrifugal cleaning step $20a_1$ of the hydrocyclone plant 20 into connection with a stock line b_1 of a second stock chest $10a_2$.

In the embodiment, wire water from the paper machine is passed to a wire pit 110 through a line d_1 , which wire pit 110 in this embodiment is formed by a planar wire pit structure, a so-called flume, which comprises a horizontal flow path for wire water. Said wire pit 110 removes effectively air in bubble form from the wire water, and pre-deaeration of the wire water is accomplished by means of said wire pit type. The wire water is passed from the wire pit 110 through a discharge line d_2 and a pump P_{30} to a deaeration tank $13a_3$, from which there is further a discharge line f_3 leading into connection with the line b_1 of the stock M_2 of the second stock chest $10a_2$ via a mixing device 12. The line f_4 leads further from the discharge line f_3 of the deaeration tank $13a_3$ into connection with the line a_1 of the stock M_1 of the first stock chest $10a_1$ via the mixing device 120. A branch line f_5 leads further from the line f_3 to a pump P_{40} and further from the pressure side of the pump P_{40} to a machine screen $14a_3$, which conducts the wire water further as accept from the machine screen $14a_3$ to a dilution water inlet header J_2 of a headbox 100.

The stock M_2 is passed from the stock chest $10a_2$ through a pump P_{50} along the line b_1 to the mixing device 12 in order to be combined with the stock coming as accept along the line a_3

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from the hydrocyclone plant 20 and with the dilution water coming along the line f_3 . After that the diluted stock is pumped by means of a headbox feed pump P_{60} through a machine screen $14a_4$ to a stock inlet header J_1 of the headbox 100.

As shown in FIG. 3, the hydrocyclone plant 20 includes several centrifugal cleaning steps $20a_1, 20a_2, 20a_3$, so that, as shown in the figure, accept from the first step $20a_1$ is passed through the line a_3 further into connection with the line b_1 of the stock M_2 of the second chest $10a_2$. As shown in FIG. 3, the stock is passed through the line a_1 as a feed to the first centrifugal cleaning step of the hydrocyclone plant 20, i.e. to the hydrocyclone $20a_1$. The stock flows along a spiral-shaped path inside the hydrocyclone $20a_1$ and heavier particles separate as reject from the bottom of the hydrocyclone and lighter particles rise as accept further through the line a_3 into the line b_1 of the stock M_2 passed from the second stock chest $10a_2$. There can be several hydrocyclones $20a_1, 20a_2, 20a_3 \dots$ and the reject from the first hydrocyclone $20a_1$ can be passed further to the second hydrocyclone $20a_2$ as its feed and the accept from it in one embodiment can be passed further to the line b_1 of the stock M_2 of the second stock chest $10a_2$.

The figure shows a headbox 100. The headbox 100 in accordance with the invention is advantageously a so-called dilution headbox, which means that the dilution water passed to the dilution water inlet header J_2 is passed further across the width of the headbox to different points of the stock passed from the stock inlet header J_1 . In this way, dilution makes it possible to regulate the basis weight of the web across the width of the web. The dilution water passed from the dilution water inlet header J_2 is passed to ducts which are provided with dilution water valves, by means of which the supply of dilution water can be regulated as desired across the width of the headbox, thus enabling the basis weight of the web to be regulated to be even across the entire width of the web.

As shown in the figure, the hydrocyclone plant can also include several accept lines, the stock passed through them being conducted into connection with another stock or with stocks passed from other chests. In accordance with the invention, it is also possible to use several stock chests, but in the invention only that stock, such as the broke-containing stock M_1 , which shall be treated in the hydrocyclone plant is circulated through the hydrocyclone plant 20. The pulp fraction M_2 which need not be cleaned with hydrocyclones is passed directly to deaeration and, after a machine screen, to the stock inlet header J_1 of the headbox 100. The accept derived from the stock M_1 in the centrifugal cleaning 20 is conducted into connection with said stock.

When the stocks M_1 and M_2 of the chests $10a_1, 10a_2$ are referred to in this application, it is also possible to call them a pulp fraction M_1 and a pulp fraction M_2 . In this application, the paper machine is understood to mean paper, board and tissue machines.

The broke can be formed of paper broke, which can include trimmings or paper passed to a pulper in connection with web breaks.

The present application refers to lines by which are meant stock lines, pipes, ducts along which stock/wire water is passed.

The invention claimed is:

1. An apparatus for treatment of stock passing to a headbox of a paper machine, comprising:
 - a short circulation of the paper machine;
 - a first stock chest;
 - a hydrocyclone plant forming a part of the short circulation, the hydrocyclone plant connected to the first stock

chest by a first stock transporting line, the hydrocyclone plant having an accept outlet line;

a second stock chest having a second stock transporting line;

a mixing device which is connected to receive stock from the second stock transporting line, the mixing device being connected in stock receiving relation to the accept outlet line so that stock flowing along the accept outlet line is mixed in the mixing device with stock flowing along the second stock transporting line; and wherein a third stock transporting line is connected in stock supplying relation to the headbox.

2. The apparatus of claim 1, wherein the first stock chest contains stock containing broke.

3. The apparatus of claim 2, wherein the stock in the first stock chest contains, in addition to broke pulp, recovered fiber pulp, and mechanical pulp.

4. The apparatus of claim 1, wherein the second stock chest contains stock which has been cleaned by hydrocyclones.

5. The apparatus of claim 4 wherein the second stock chest stock comprises recycled fiber or chemical pulp.

6. The apparatus of claim 1, further comprising; a wire pit connected between the first stock chest and the hydrocyclone plant;

a deaeration tank having a discharge;

a wire water supply line connecting the wire pit to the deaeration tank;

a machine screen connected to receive wire water from the deaeration tank; and

a dilution water inlet header, in wire water receiving relation to the deaeration tank and in dilution water supplying relation to the head box.

7. The apparatus of claim 6, further comprising;

a first pump connected between the first stock chest and the wire pit;

a second pump connected between the wire pit and the hydrocyclone plant;

a third pump connected between the wire pit and the deaeration tank; and

a fourth pump connected between the deaeration tank discharge and the dilution inlet header.

8. The apparatus of claim 1, wherein the third stock transporting line is connected in stock supplying relation to the headbox through a stock inlet header of the headbox; and wherein the third stock transporting line includes:

a deaeration tank having a discharge line;

a pump connected to said deaeration tank discharge line and having a pressure side; and

a machine screen which is connected to the pressure side of said pump and which is connected to the stock inlet header of the headbox.

9. The apparatus of claim 1, further comprising:

a wire pit connected between the first stock chest and the hydrocyclone plant; and

a dilution water line from the wire pit which joins the accept outlet line and the second stock transporting line at the mixing device in supplying relation to the third stock transport line.

10. An apparatus for treatment of stock passing to a headbox of a paper machine, comprising:

a short circulation of the paper machine;

a first stock chest;

a hydrocyclone plant forming a part of the short circulation, the hydrocyclone plant connected to the first stock chest by a first stock transporting line, the hydrocyclone plant having an accept outlet line;

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in one embodiment can be passed further to the line b_1 of the stock M_2 of the second stock chest $10a_2$.

[0038] The figure shows a headbox 100. The headbox 100 in accordance with the invention is advantageously a so-called dilution headbox, which means that the dilution water passed to the dilution water inlet header J_2 is passed further across the width of the headbox to different points of the stock passed from the stock inlet header J_1 . In this way, dilution makes it possible to regulate the basis weight of the web across the width of the web. The dilution water passed from the dilution water inlet header J_2 is passed to ducts which are provided with dilution water valves, by means of which the supply of dilution water can be regulated as desired across the width of the headbox, thus enabling the basis weight of the web to be regulated to be even across the entire width of the web.

[0039] As shown in the figure, the hydrocyclone plant can also include several accept lines, the stock passed through them being conducted into connection with another stock or with stocks passed from other chests. In accordance with the invention, it is also possible to use several stock chests, but in the invention only that stock, such as the broke-containing stock M_1 , which shall be treated in the hydrocyclone plant is circulated through the hydrocyclone plant 20. The pulp fraction M_2 which need not be cleaned with hydrocyclones is passed directly to deaeration and, after a machine screen, to the stock inlet header J_1 of the headbox 100. The accept derived from the stock M_1 in the centrifugal cleaning 20 is conducted into connection with said stock.

[0040] When the stocks M_1 and M_2 of the chests $10a_1$, $10a_2$ are referred to in this application, it is also possible to call them a pulp fraction M_1 and a pulp fraction M_2 . In this application, the paper machine is understood to mean paper, board and tissue machines.

[0041] The broke can be formed of paper broke, which can include trimmings or

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pressure side of the pump P_2 to a first centrifugal cleaning step $20a_1$ of the hydrocyclone plant 20 situated in the short circulation of the paper machine. In the figure, the centrifugal cleaning steps are designated with $20a_1$, $20a_2$, $20a_3$... An accept line from the centrifugal cleaning step $20a_1$ of the hydrocyclone plant 20; a line a_3 is passed further to join a line b_1 of the stock M_2 of the second stock chest $10a_2$ via a mixing device 12. The mixing device 12 is also supplied with wire water from the wire pit 11 along a line e_1 for diluting the stock M_2 to be fed to the headbox 100 to a suitable consistency.

[0028] From the upper part of the wire pit 11 there is further a line c_1 for dilution water, said line c_1 including a pump P_3 . The line c_1 leads further from the discharge side of the pump P_3 to a deaeration tank $13a_1$. The dilution water passed through the deaeration tank $13a_1$ is conducted further after the deaeration treatment to a discharge line f_1 and further while pumped by a pump P_4 to a machine screen $14a_1$, whose accepted fraction, i.e. accept, is passed to a dilution inlet header J_2 in the headbox 100.

[0029] The stock chest $10a_2$ is provided with the line b_1 for the stock and further to the suction side of a pump P_5 . On the discharge side of the pump P_5 , the line b_1 is connected to the mixing device 12, after which there is a pump P_6 in a line b_2 for pumping the combined stock further along the line b_2 to a deaeration tank $13a_2$, from which a discharge line f_2 leads further to the suction side of a pump P_7 . On the discharge side of the pump P_7 , in the line f_2 there is a machine screen $14a_2$, from which an accepted fraction, i.e. accept, is passed to a stock inlet header J_1 of the headbox 100.

[0030] In the device arrangement in accordance with the invention, only the broke-containing stock M_1 passed from the stock chest $10a_1$ is treated in the hydrocyclone plant 20. An accept line a_3 leads from said hydrocyclone plant further into connection with the stock line b_1 of the stock M_2 of the second stock chest $10a_2$. Since the stock M_2 of the second stock chest $10a_2$ comprises stock that has already

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planar wire pit structure, a so-called flume, which comprises a horizontal flow path for wire water. Said wire pit 110 removes effectively air in bubble form from the wire water, and pre-deaeration of the wire water is accomplished by means of said wire pit type. The wire water is passed from the wire pit 110 through a discharge line
5 d_2 and a pump P_{30} to a deaeration tank $13a_3$, from which there is further a discharge line f_3 leading into connection with the line b_1 of the stock M_2 of the second stock chest $10a_2$ via a mixing device 12. The line f_4 leads further from the discharge line f_3 of the deaeration tank $13a_3$ into connection with the line a_1 of the stock M_1 of the first stock chest $10a_1$ via the mixing device 120. A branch line f_5 leads further from
10 the line f_3 to a pump P_{40} and further from the pressure side of the pump P_{40} to a machine screen $14a_3$, which conducts the wire water further as accept from the machine screen $14a_3$ to a dilution water inlet header J_2 of a headbox 100.

[0036] The stock M_2 is passed from the stock chest $10a_2$ through a pump P_{50} along the line b_1 to the mixing device 12 in order to be combined with the stock coming as
15 accept along the line a_3 from the hydrocyclone plant 20 and with the dilution water coming along the line f_3 . After that the diluted stock is pumped by means of a headbox feed pump P_{60} through a machine screen $14a_4$ to a stock inlet header J_1 of the headbox 100.

[0037] As shown in Fig. 3, the hydrocyclone plant 20 includes several centrifugal
20 cleaning steps $20a_1, 20a_2, 20a_3$, so that, as shown in the figure, accept from the first step $20a_1$ is passed through the line a_3 further into connection with the line b_1 of the stock M_2 of the second chest $10a_2$. As shown in Fig. 3, the stock is passed through the line a_1 as a feed to the first centrifugal cleaning step of the hydrocyclone plant 20, i.e. to the hydrocyclone $20a_1$. The stock flows along a spiral-shaped path inside the
25 hydrocyclone $20a_1$ and heavier particles separate as reject from the bottom of the hydrocyclone and lighter particles rise as accept further through the line a_3 into the line b_1 of the stock M_2 passed from the second stock chest $10a_2$. There can be several hydrocyclones $20a_1, 20a_2, 20a_3...$ and the reject from the first hydrocyclone $20a_1$ can be passed further to the second hydrocyclone $20a_2$ as its feed and the accept from it